Land Use in Hazard Areas – Risk Management and Public Policy Opportunities

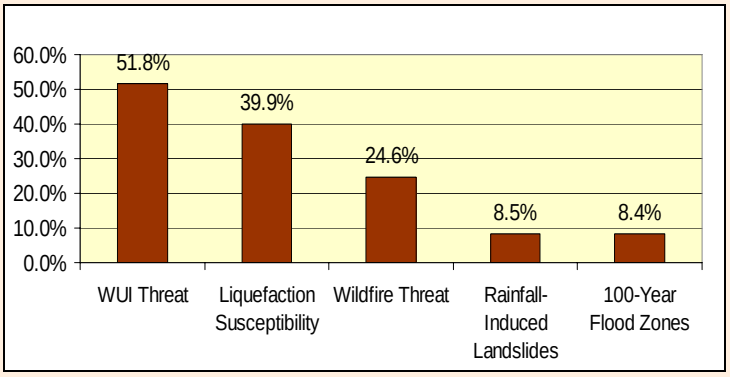
The Bay Area is growing in hazard areas.

From 2000 to 2005, Bay Area added 307,938 people and 116,960 new households. Urban land[(1)] totaled 1,075,200 acres in 2000. The region added 63,700 acres of new or significantly denser urban development from 2000 to 2005. The Bay Area is projected to continue to grow, adding 1,655,400 more people, 599,240 new households, and 1,603,640 new jobs by 2030 (Source: ABAG's **Projections 2005**).

This growth continues to place increasing pressure on the region to expand urban development, both by increasing the density of areas of existing urban and inner suburban housing, and by the conversion of agricultural and grazing lands to suburban development.

As shown on the following graph, during the period from 2000 to 2005, we continued to build in hazardous areas – in spite of numerous regulations.

Figure: Land Use Change in Hazard Areas – 2000-2005



For example, while **22.3%** of the region's land is subject to liquefaction, **39.9%** of the land newly developed or redeveloped from 2000-2005 is in these areas. In addition, while **18.5%** of the region's land is in a wildland-urban-interface fire threat area, amazingly, **51.8%** of the land newly developed or redeveloped from 2000-2005 is in these areas.

(1) Urban land is non-agricultural developed land, that is, residential, commercial, industrial, infrastructure, military, and public/institutional uses.

Ways to improve disaster-resistance in hazard areas.

While the best solution would be to completely avoid hazardous areas, this is not always practical in urban areas. Therefore, the state, in a desire to build more disaster-resistant communities and create more environmentally-sensitive growth, has adopted building and fire codes, as well as three laws related to land use and disaster mitigation.

Building codes, fire codes, and landslide mitigation can mitigate the effects of these hazards, but cannot eliminate the threat of damage – no building is earthquake "proof" or fire "proof" or flood "proof."

It is essential that local governments not only implement existing state laws, but also institute additional local regulations, particularly related to hillside areas and areas next to the Bay on Bay mud.

The following three pages list some of the types of regulations and policy strategies that local governments can use to mitigate the increased hazard exposure associated with building in areas subject to earthquake, wildfires, flooding, and landslides.

For a comprehensive list of these and other regulations and policies for hazard mitigation, see **http://quake.abag.ca.gov/mitigation/strategies.html.**

State Laws Applying to Multiple Hazards –

Every city and county is required to prepare a ***General Plan***. Over the years, required elements have been specified, including the Safety and Seismic Safety elements (now consolidated into a single ***Safety Element***), which has been required since 1971. The General Plan contains seven required elements outlining local policies guiding future development in the jurisdiction. Local zoning for future development is required to be consistent with the policies identified in this General Plan (except for in charter cities).

Safety Elements should be updated at least every five years. Does your plan need to be updated?

All California cities and counties have a Safety Element, either as a separate document or integrated into their General Plan. As part of that plan, jurisdictions must identify and map natural hazards.

See http://ceres.ca.gov/planning/genplan/gpg.pdf for the State of California General Plan Guidelines published by the California Office of Planning and Research (OPR).

Local Regulations Applying to Multiple Hazards –

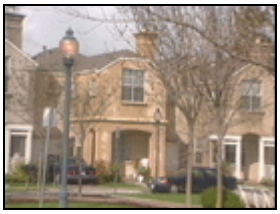
Smart Growth programs are intended to revitalize urban areas and promote sustainability **as an alternative to developing in outlying and hazard-prone areas**. ABAG and the other regional agencies in the region, including the Metropolitan Transportation Commission (MTC) and the Bay Area Air Quality Management District have adopted polices to promote Smart Growth. In addition, boards of supervisors of all nine Bay Area counties and city councils of 66 of the regions cities have taken action in support of the objectives of the Bay Area Alliance for Sustainable Communities, is a multi-stakeholder coalition established in 1997 to develop and implement an action plan that will lead to a more sustainable region. Ways to meld Smart Growth and sustainability concepts with hazard mitigation include –

1) Prioritizing retrofit of infrastructure that serves urban areas over constructing new infrastructure to serve outlying areas.
2) Working to retrofit homes in older areas to provide safe housing close to job centers.
3) Working to retrofit older downtown areas to protect architectural diversity and promote disaster-resistance.
4) Protecting areas susceptible to extreme hazards as open space.
5) Providing new buffers and preserving existing buffers between urban development and existing users of large amounts of hazardous materials, such as major industry, due to the potential for catastrophic releases in a major earthquake, flood, or terrorism disaster.

Hillside development can be problematic due to the potential hazards of wildfire and landsliding. The pressure to convert hillside areas to urban uses is great, however, in inner suburban communities that have no remaining non-urban land, as well as in communities actively preserving agricultural land (particularly in the North Bay where vineyards are prevalent). Tools to mitigate risks available to local governments are –

1) Establishing a buffer zone between residential properties and landslide or wildfire hazard areas.
2) Discouraging, adding additional mitigation strategies for, or preventing construction on slopes greater than a set percentage, such as 15%, due to landslide or wildfire hazard concerns.

Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP) Policy Number



LAND-f-1

LAND-f-2

LAND-f-3

LAND-f-4

LAND-f-5

LAND-e-1

LAND-e-2

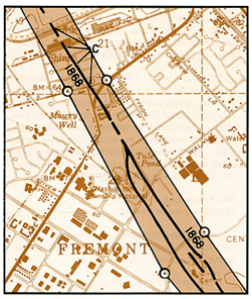
State Laws Applying to Earthquakes –

The ***Seismic Hazards Mapping Act*** of 1990 requires the preparation of site-specific geotechnical reports for development proposals in areas identified as Zones of Required Investigation for ***earthquake-induced landslides or liquefaction*** as designated by the State Geologist. Cities and Counties are also required to incorporate the Official Seismic Hazard Zone Maps into their Safety Elements. Lastly, the Seismic Hazards Mapping Act, as well as the Natural Hazard Disclosure Statement, requires sellers of real property to disclose to buyers if property is within a Zone of Required Investigation. Due to funding, Seismic Hazard Zone maps have only been completed in selected portions of the Bay Area. As maps become available, affected cities and counties are required to enforce the preparation of these reports and condition project approval on the incorporation of necessary mitigation measures related to site remediation, structure and foundation design, and/or avoidance.

Multi-Jurisdictional Local Hazard Mitigation Plan (LHMP) Policy Number LAND-a-2

This Act must be implemented by cities and counties in the region with hazards mapped by CGS. In 2005, this included San Francisco and parts of Alameda, Contra Costa, San Mateo, and Santa Clara counties, as well as 43 cities.

The ***Alquist-Priolo Earthquake Fault Zoning Act*** of 1972 was passed by the legislature as a result of the San Fernando earthquake in southern California. This Act is intended to deal with the specific hazard of active faults that extend to the earth's surface, creating a ***surface rupture hazard***. The Act requires that the State Geologist (the head of the California Geological Survey – CGS) designate zones approximately ¼-mile wide along known active faults. Within these zones, site-specific geologic reports must be prepared for development proposals (except for housing developments of less than four units or not involving structures intended for human occupancy). Typically, at a minimum, structures intended for human occupancy cannot be placed within 50 feet of an active fault trace. Finally, the Act requires disclosure to potential buyers in these zones.



LHMP Policy Number LAND-a-1

Every city and county with a mapped surface rupture hazard is required to implement this Act. In 2005, this included eight counties (all but San Francisco) and 31 cities in the Bay Area. Make sure that this is an* Existing Program *if yours is one of these jurisdictions.

Local Regulations Applying to Earthquakes –

First, Section 2624 of the Fault Zoning Act specifically states that local governments have the authority to recognize that some faults may be a hazard for surface rupture even though they do not meet the strict criteria imposed by the Fault Zoning Act. For example, zones have been identified by Santa Clara County and by the City of Saratoga for the Monte Vista-Shannon fault system.

LHMP Policy Number LAND-a-3

Second, recognizing that CGS has not completed earthquake-induced landslide and liquefaction mapping for significant portions of the Bay Area, local governments can require geologic reports in areas mapped by others as having significant liquefaction or landslide hazards.

LAND-a-4

Third, CGS's efforts to complete the earthquake-induced landslide and liquefaction mapping will be easier if cities and counties cooperate by providing access to their records and by expediting permitting for new research conducted in their jurisdiction.

LAND-a-5

Finally, local governments review the geologic and engineering reports prepared by developers to implement the Fault Zoning Act and the Seismic Hazards Mapping Act. Local governments are required to ensure that reviews are conducted by appropriately trained and credentialed personnel, whether they use their own staff or outside consultants.

LAND-a-4

Local Regulations Applying to Wildfire and Structural Fires –

Local government regulations mitigating fire hazards include –

1) Reviewing development proposals to ensure that they incorporate required and appropriate fire-mitigation measures, including adequate provisions for occupant evacuation and access by emergency response personnel and equipment.
2) Developing a clear legislative and regulatory framework at both the state and local levels to manage the wildland-urban-interface consistent with ***Fire Wise*** and sustainable community principles.

LHMP Policy Number

LAND-b-1

LAND-b-2

Local Regulations Applying to Flooding –

Local government regulations mitigating flooding hazards include –

1) Establishing and enforce requirements for new development so that site-specific designs and source-control techniques are used to manage peak stormwater runoff flows and impacts from increased runoff volumes.
2) Incorporating FEMA guidelines, regulatory standards (such as ASCE 24), and other suggested activities into local government plans and procedures for managing flood hazards.
3) Providing an institutional mechanism to ensure that development proposals adjacent to floodways and in floodplains are referred to flood control districts and wastewater agencies for review and comment (consistent with the NPDES program).
4) Establishing and enforce regulations concerning new construction (and major improvements to existing structures) within flood zones in order to be in compliance with federal requirements and, thus, be a participant in the Community Rating System of the ***National Flood Insurance Program.***

LHMP Policy Number

LAND-c-1

LAND-c-2

LAND-c-3

LAND-c-4

Local Regulations Applying to Landslides and Erosion –

Local government regulations mitigating rainfall-induced landsliding hazards and erosion include –

1) Establishing and enforcing provisions (under subdivision ordinances or other means) that geotechnical and soil-hazard investigations be conducted and filed to prevent grading from creating unstable slopes, and that any necessary corrective actions be taken prior to development approval.
2) Requiring that local government reviews of these investigations are conducted by appropriately trained and credentialed personnel.
3) Establishing and enforcing grading, erosion, and sedimentation ordinances by requiring, under certain conditions, grading permits and plans to control erosion and sedimentation prior to development approval.
4) Establishing and enforcing provisions under the creek protection, storm water management, and discharge control ordinances designed to control erosion and sedimentation.
5) Establishing requirements in zoning ordinances to address hillside development constraints, especially in areas of existing landslides.

LHMP Policy Number

LAND-d-1

LAND-d-2

LAND-d-3

LAND-d-4

LAND-d-5

CREDITS – This pamphlet was prepared by J. Perkins, Earthquake and Hazards Program Manager, Association of Bay Area Governments (ABAG), using funding, in part, from FEMA for the development of the Bay Area Local Hazard Mitigation Plan. For a full description of land use patterns in the Bay Area and their relationship to various hazards, see Appendix E of the multi-jurisdictional Local Hazard Mitigation Plan at **http://quake.abag.ca.gov/mitigation/plan.html**. Photos – ABAG–page 1 and page 2 (top); USGS–page 2 (bottom); CGS–page 3; CDF–page 4 (top); EPA–page 4 (bottom).